

ANTI-VIBRATION PLATFORM FOR SEMICONDUCTOR EQUIPMENT

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to an anti-vibration platform, and more particularly to an anti-vibration platform for semiconductor equipment that is constructed by assembling a plurality of ball couplings, connecting bars, and vertical supports to one another, and provided with special anti-vibration measures to be safer and more convenient and durable for use.

[0003] 2. Description of the Prior Art

[0004] Most of the conventional platforms for supporting semiconductor equipment are constructed by welding steel frames together and then provided the welded steel frames with flexible vibration-isolating structures. For example, the vibration-isolating structure disclosed in Taiwan Publication No. 530862 includes horizontal upper and lower base plates, and a column vertically connected to and located between the upper and the lower plates via upper and lower annular cushions. The vertical column is provided around its outer surface with shrouding means based on the Poisson's Ratio in the elasticity, so that the structure so formed naturally has a large vertical rigidity for supporting the structure weight, and a large horizontal softness for isolating the structure from earthquake energy. The vibration-isolating structure is characterized in that the vertical column is formed with a plurality of V-shaped grooves. An annular shrouding means is arranged at the tip of each of the V-shaped groove, and preload is applied to the shrouding means. An energy dissipator is provided in the vertical column to form an integrated body. The upper and lower plates are formed with holes for fastening respectively to the pillar and ground of a building. The vertical column, and upper and lower plates can be of circular, rectangular, oval or rhombus shape. The upper and lower plates are connected to the vertical column by means of a mooring device.

[0005] The conventional high-rigidity structures developed in the early stage did not thoroughly consider the problem of vibration isolation. Having been affected by the disasters caused by earthquakes, the construction and architecture fields have changed their design concepts. However, the current construction design involving vibration isolation, vibration protection or vibration absorption only relates on elastic members attached to the basis of the main structure. When the platform or the whole structure is subject to vibration, the vibration-isolating means thereof are vibrated at the same time and therefore provide only very limited protection to the main structure. It is therefore desirable to develop an anti-vibration structure that is vibration-resistant to effectively protect the main structure from damage caused by the vibration.

SUMMARY OF THE INVENTION

[0006] A primary object of the present invention is to provide an anti-vibration platform for semiconductor equipment, which is constructed by connecting various components in a convenient, safe, durable, and vibration-resistant manner.

[0007] According to the present invention, the components for the anti-vibration platform include a ball coupling having a spherical body with a truncated top, on which at least one threaded hole is provided. The spherical body of the ball coupling is also provided on the spherical surface with a plurality of threaded holes for connecting to threaded ends of rigid connecting bars and vertical supports.

[0008] Since the anti-vibration platform of the present invention is constructed by assembling various components together, it can be more conveniently and quickly transported and erected for use without the need of big-scaled machinery. And, since the components for the platform of the present invention may be freely assembled, the platform may be welded at a safe site and then transported to the construction site for erection to maintain the required quality and safety of the platform.

[0009] Moreover, the platform of the present invention may be freely extended in two dimensions and locally repaired to reduce the construction cost thereof.

[0010] To prevent the components of the platform, particularly those at the bottom of the platform, from loosening or separating from one another, anti-vibration and pressure-resistant elastomeric material may be applied to the bottom of the platform to wrap joints of the ball couplings, the connecting bars, and the vertical supports, and any other welded joint on these components, making the bottom of the platform safer and more secure for use.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The structure and the technical means adopted by the present invention to achieve the above and other objects can be best understood by referring to the following detailed description of the preferred embodiments and the accompanying drawings, wherein

[0012] Fig. 1 is a fragmentary, exploded perspective view of an anti-vibration platform for semiconductor equipment according to the present invention;

[0013] Fig. 2 is an assembled view of Fig. 1;

[0014] Fig. 3 shows an example of the platform of the present invention constructed by connecting a plurality of rigid connecting bars and vertical supports to a plurality of ball couplings;

[0015] Fig. 4 is a fragmentary, assembled sectional view of the present invention showing the connection of the rigid connecting bars and the vertical supports to the ball couplings;

[0016] Fig. 5 is an enlarged view of the circled area A in Fig. 4; and

[0017] Fig. 6 is a fragmentary, assembled side view of the anti-vibration

platform according to another embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0018] Please refer to **Figs. 1** and **2** that are fragmentary exploded and assembled perspective views, respectively, of an anti-vibration platform for supporting a semiconductor equipment thereon in accordance with a preferred embodiment of the present invention. As shown, the anti-vibration platform for semiconductor equipment according to the present invention is constructed from a plurality of ball couplings **1** and **1a**, a plurality of rigid connecting bars **2**, and a plurality of vertical supports **3**.

[0019] Each of the ball couplings **1**, **1a** includes a spherical body **11** having a plurality of internally threaded holes **14** provided at predetermined points on a spherical outer surface thereof.

[0020] The ball coupling **1a** is for use at a top of the constructed anti-vibration platform and has a spherical body **11** with a truncated top **12**, on which at least one internally threaded hole **13** is provided.

[0021] Each of the rigid connecting bars **2** includes a barred body **22** having a predetermined length, and an adapting head **21** firmly fitted to each end of the barred body **22** by way of full-circled welding at a joint of the adapting head **21** and the end of the barred body **22**. The adapting head **21** is provided at a front end with an externally threaded rod **23** for screwing into the internally threaded hole **14** on the spherical body **11** of the ball coupling **1**, **1a**.

[0022] Each of the vertical supports **3** includes a steel pipe **32**, and an adapting cap **31** fitted to each end of the steel pipe **32**. The adapting cap **31** includes an end cap **311**, an extended section **313** projected from an outer side of the end cap **311**, and an externally threaded rod **312** projected from an outer end of the extended section **313**. The externally threaded rod **312** may be screwed into the internally threaded hole **14** on the ball coupling **1**, **1a** for the vertical support **3**

to stably connected at two ends to a top ball coupling **1a** and a bottom ball coupling **1**.

[0023] By way of assembling the above-described components to one another, an anti-vibration platform for semiconductor equipment or other applications may be formed to substitute for conventional platforms. **Fig. 3** shows an example of the anti-vibration platform of the present invention constructed by connecting a plurality of the rigid connecting bars **2** and the vertical supports **3** to a plurality of the ball couplings **1**, **1a**. It is understood the anti-vibration platform so constructed has an area that can be properly adjusted depending on different factors, such as the environment in which the platform is to be used, the function to be provided by the platform, and other actual needs.

[0024] Please refer to **Fig. 4** that is a fragmentary, assembled sectional view of the anti-vibration platform according to the present invention showing the connection of the rigid connecting bars **2** and the vertical supports **3** to the ball couplings **1**, **1a**, and to **Fig. 5** that is an enlarged view of the circled area **A** of **Fig. 4**. In practical implementation of the present invention, the anti-vibration platform for semiconductor equipment is covered at a bottom and all four sides with steel plates **4**. Moreover, threaded rods **312** are provided to extend through the steel plates **4** at each side of the platform that is adjacent to a concrete foundation **5**, so that the spherical bodies **11** of the ball couplings **1**, **1a** adjacent to the concrete foundation **5** are firmly screwed to the concrete foundation **5** via the threaded rods **312**. Alternatively, the threaded rods **312** may be replaced with conventional anchor bolts.

[0025] A flat bed **6** is positioned on the top of the anti-vibration platform for semiconductor equipment. The flat bed **6** is provided at predetermined positions with a plurality of externally threaded rods **312**. By screwing the threaded rods **312** on the flat bed **6** into the internally threaded holes **13** on the top ball couplings **1a**, the flat bed **6** is firmly supported on the truncated tops **12** of the ball couplings **1a**.

[0026] The vertical support 3 is vertically screwed at two ends to the ball coupling 1 and the ball coupling 1a, and the rigid connecting bars 2 are either horizontally connected at two ends to two ball couplings 1 or 1a, or diagonally connected at two ends to two ball couplings 1 and 1a. When the flat bed 6 is subject to an external force and vibrated, the platform below the flat bed 6 is useful in protecting the flat bed 6 against vibration.

[0027] Fig. 6 is a fragmentary, assembled side view of the anti-vibration platform according to another embodiment of the present invention. In this embodiment, an anti-vibration and pressure-resistant elastomeric material 7, such as an epoxy resin material, is applied at positions at where the ball couplings 1, the rigid connecting bars 2, and the vertical supports 3 are connected to one another, so that these components are connected without the risk of loosening and separating from one another.

[0028] The present invention has been described with some preferred embodiments thereof and it is understood that many changes and modifications in the described embodiments can be carried out without departing from the scope and the spirit of the invention that is to be limited only by the appended claims.